

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney Docket No.: **SAK007/JTN**

Anticipated Classification of this
Application:

Class 473 Sub Class 341

Prior Application: **S.N. 08/955,801**

The Commissioner of Patents
& Trademarks
Washington, D.C.
U.S.A. 20231

Dear Sir:

This is a request for filing a

- ☐ Continuation application
☒ Divisional application

under 37 CFR 1.60, of pending prior application Serial No. 08/955,801 filed on October 22, 1997 of John Saksun, Sr. for a "Golf Club Head and Method of Making Same".

1. ☒ Enclosed is a copy of the prior application including the oath or declaration as originally filed and an affidavit or declaration verifying it is a true copy.
2. ☐ Enclosed is a copy of the prior application as filed.
- 3 a). ☒ The filing fee is calculated below:

	Number Filed	Number Extra	Rate	Total
Total Claims	5 - 20 =		X \$9	=
Independent Claims	1 - 3 =		X \$39	=
Multiple Dependencies			Flat Rate	=
Base Fee				<u>\$380.00</u>
TOTAL FILING FEE				<u>\$380.00</u>

- 3 b). ☒ Small Entity Status. We respectfully request that this application be accorded small entity status pursuant to 37 CFR 1.27 for the purpose of

paying fees, on the basis that a verified statement establishing small entity status has been filed in the parent application (37 CFR 1.60).

4. ☐ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Account No. _____. Three copies of this sheet are enclosed.
5. ☒ A cheque in the amount of \$ 380.00 is enclosed.
6. ☒ Cancel in this application original claims 1 - 26 of the prior application before calculating the filing fee. (At least one original independent claim must be retained for filing purposes.)
7. ☒ Amend the specification by inserting before the first line the sentence: --Division of 08/955,801--.
8. ☐ Transfer the drawings from the prior application to this application and abandon said prior application as of the filing date accorded this application. A duplicate copy of this sheet is enclosed for filing in the prior application file (May only be used if signed by person authorized by Rule 138 and before payment of base issue fee.).
- 8 a). ☐ New formal drawings are enclosed.
- 8 b). ☐ Priority of application Serial no. _____ filed _____ in _____ is claimed under 35 U.S.C. 199.
9. ☐ The prior application is assigned of record to _____.
10. ☒ The power of attorney in the prior application is

James T. Nenniger	32,670
Gregory A. Piasetzki	37,056
- 10 a). ☒ The power appears in the original papers in the prior application.
- 10 b). ☐ Since the power does not appear in the original papers, a copy of the power in the prior application is enclosed.
- 10 c). ☒ Address all future communications to James T. Nenniger or Gregory A. Piasetzki at Piasetzki & Nenniger, 120 Adelaide Street West, Suite 2308, Toronto, Ontario, Canada, M5H 1T1, Telephone (416) 955-0050.
11. ☐ A preliminary amendment is enclosed. (Claims added by this amendment have been properly numbered consecutively, beginning with the number

next following the highest numbered original claims in this prior application.)

12. [X] I hereby verify that the attached papers are a true copy of prior application Serial No. 08/955,801 as originally filed on October 22, 1997 and that no amendments referred to in the oath or declaration filed to complete the prior application introduced new matter.

The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such wilful false statements may jeopardize the validity of the application or any patent issuing thereon.

Oct. 26, 1999
Date



Piasetzki & Nenniger
James T. Nenniger
Registration No. 32,670

JTN/JW

Attorney of Record

UNITED STATES

PATENT APPLICATION

PIASETZKI & NENNIGER

File sak006/JTN

Title:

GOLF CLUB HEAD AND METHOD OF MAKING THE SAME

Inventor(s):

JOHN SAKSUN SR.

Title: GOLF CLUB HEAD AND METHOD OF MAKING THE SAME

FIELD OF THE INVENTION

5 This invention relates to sporting equipment, and more particularly to golf equipment. Most particularly, this relates to a golf club and the head therefor.

BACKGROUND OF THE INVENTION

10 Golf clubs have changed dramatically over the years. Originally, the longer hitting clubs were made from wood and hence are referred to as "woods." New materials have become available which have been applied to the art of golf club manufacturing. For example club heads are now made from metal, and are called metal woods. Additionally graphite
15 shafts are now used where once steel shafts were used.

With the new materials have also come new design shapes and sizes. Most dramatically, has been the trend over the recent few years to use a larger sized club head which allegedly results in a larger sweet spot and hopefully longer and more consistent drives. However, such larger club
20 heads tend to be expensive and can in the hands of a less skilled player produce inconsistent results.

Another trend in the past has been to design better weighted clubs. For example, the concept of perimeter weighting a club face has been used in the design of irons to improve club performance. Weighted
25 golf club heads have also been proposed for the woods in which weights are carried in the body of the club head to improve the hitting characteristics of the club head when making contact with the ball. For example, my own prior patent U.S. patent no. 5,409,219 is directed to a moulded golf club head having a C-shaped configuration when viewed from above. Weights
30 are carried in two rearward extensions of the moulded body which includes a front striking face. This prior club provides good hitting characteristics,

because of a high moment of inertia along the arc of the swing. This prior design may also have problems with club head integrity. The moulded material tends to crack, releasing the club head from the shaft, and the weighted extensions from the body. Consequently, although delivering good performance in ball striking, improvements were required both in the design and shape of the club head and in the manner that the club head is secured to a golf club shaft to complete a golf club.

Other patents directed to weighted golf club heads include:

- United States patent number 645,942 to Cran issued 3/1900;
- 10 United States patent number 690,940 to Febiger issued 1/1902;
- United States patent number 1,318,325 to Klin issued 10/1919;
- United States patent number 1,453,503 to Holmes issued 5/1923;
- United States patent number 3,064,980 to Steiner issued 11/1962;
- United States patent number 3,652,094 to Glover issued 3/1972;
- 15 United States patent number 3,845,960 to Thompson issued 11/1974;
- United States patent number 3,966,210 to Rozmus issued 6/1976;
- United States patent number 3,979,122 to Belmont issued 9/1976;
- United States patent number 4,340,230 to Churchward issued 7/1982;
- United States patent number 4,343,472 to Hamilton issued 8/1982;
- 20 United States patent number 4,422,638 to Tucker issued 12/1983;
- United States patent number 4,580,784 to Brill issued 4/1986;
- United States patent number 4,607,846 to Perkins issued 8/1986;
- United States patent number 4,618,149 to Maxel issued 10/1986;
- United States patent number 4,655,459 to Antonious issued 4/1987;
- 25 United States patent number 4,852,879 to Collins issued 8/1989;
- United States patent number 4,871,174 to Kobayashi issued 10/1989;
- United States patent number 4,898,387 to Finney issued 2/1990;
- United States patent number 4,936,582 to Bernstein issued 6/1990;
- United States patent number 5,083,778 to Douglass issued 1/1992;
- 30 United States patent number 5,116,047 to Phelan issued 5/1992; and
- United States patent number 5,253,869 to Dingle issued 10/1993.

SUMMARY OF THE INVENTION

According to the present invention there is provided a golf club head for attaching to a golf club shaft which addresses these concerns. The main body of the club head is moulded and therefore is inexpensive to produce. Moulded into the main body are weights, which are positioned to improve the reaction of the club to twisting forces which normally arise upon contacting the ball. Also moulded into the body is a shaft receiving bore, with an associated hosozle.

Another aspect of the present invention is the use of a shaft attachment device which may be securely and permanently attached to the body, by being moulded into the body, and which may also securely receive the shaft to form a complete golf club. In a preferred embodiment, this attachment device comprises a hollow cylinder of aluminum, which is provided with surface irregularities on an outer surface to form a strong bond with the mouldable material of the main body. The inner surface is smooth and sized and shaped to closely receive a golf club shaft therein. This facilitates the formation of a strong epoxy bond or other glue bond between the shaft of a golf club and the golf club main body.

Another aspect of the invention is the use of a two step moulding process which involves moulding the main body, with an opening for the front face. The next step involves moulding an insert to form a striking face on the front of the main body. In this way the main body can be made from a different material from the insert, allowing for a more specific and appropriate design. In particular to give the club good feel it is desired to form the main body of the club from a softer material, while to improve ball speed off of the club face and to achieve distance it is an aspect of this invention to form the insert from a harder material.

Therefore there is provided according to the present invention a golf club head comprising:

a main body moulded from a mouldable material having a first lower density;

means for weighting said main body, said weighting means having a second higher density and being positioned within said main body to enhance the striking characteristics of the main body;

a shaft receiving bore formed in the main body; and

5 a shaft anchoring element proximate to said shaft receiving bore, said shaft anchoring element being moulded into said main body and being sized and shaped to receive a golf club shaft therein

wherein said main body may be securely attached to a golf club shaft.

10 According to another aspect of the present invention there is provided a golf club head comprising:

a main body moulded from a mouldable material having a first lower density and a first hardness;

15 means for weighting said main body, said weighting means having a second higher density and being positioned laterally within said main body to enhance the striking characteristics of the main body when used as a club head;

a shaft receiving bore formed in the main body;

20 a shaft anchoring element proximate to said shaft receiving bore, said shaft anchoring element being moulded into said main body and being sized and shaped to receive a golf club shaft therein; and

a moulded face insert having a second hardness which is greater than said first hardness.

25 According to yet a further aspect of the present invention there is provided a method of moulding a golf club head comprising:

a) positioning weights within a mould;

b) moulding a main body around said weights, including forming a shaft receiving bore in said main body;

c) forming a front insert receiving pocket on said main body;

30 d) inserting an insert into said insert receiving pocket; and

e) finishing said club face.

BRIEF DESCRIPTION OF THE DRAWINGS

Reference will now be made, by way of example only, to preferred embodiments of the invention as illustrated in the attached drawings, in which:

5 Figure 1 is a perspective view of a golf club head according to the present invention attached to a shaft;

 Figure 2 is a further perspective view from below and to one side of the golf club head of Figure 1 along lines 2-2;

 Figure 3 is a sectional view of a partially completed golf club
10 head of Figure 1 along lines 3-3;

 Figure 4 is a front view of the partially fabricated golf club head of Figure 3 according to the present invention;

 Figure 5 is a view in part section in the direction of arrow 5 of the golf club head of Figure 3 according to the present invention; and

15 Figure 6 is a detail view of a shaft attached to the golf club head according to a second embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

 Figure 1 illustrates a golf club head 10 according to the
20 present invention. The golf club head 10 includes a moulded main body 12 which has a front ball striking face 14 and a rearwardly extending body portion 16. The body portion tapers as shown at 18 and includes an aerodynamic dimple 20. The dimple 20 is formed on the top side of the main body 12. The dimple 20 alters the air flow around the club and may
25 help to reduce aerodynamic drag during use.

 Also formed in the main body 12 is a hosozle 22 which surrounds a shaft receiving bore 24. As shown in Figure 1, a shaft 26 having a grip 27 is inserted into the shaft receiving bore 24 to form a golf club. The attachment of the shaft 27 to the club head 10 is described in
30 more detail below.

As shown in Figure 3, included in the main body 12 are weight means 30, 31. Each weight means 30, 31 includes a tapered rearwardly extending portion 32 which may be in the shape of a bullet as illustrated. Each weight means 30 further includes a cylindrical section 34 which has an exterior surface 36 which is roughened to promote engagement and attachment between the moulded main body 12 and the weight means 30, 31. Most preferably, the surface 36 is knurled, to provide good surface interaction between the weight means 30 and the moulded main body 12.

Most preferably, the weight means 30, 31 are formed of a dense material, such as metal. Adequate results have been achieved with brass, although other metals or dense materials may also be used.

As seen in Figures 3 and 4, the weight means 30, 31 are preferably located on opposite sides of the club head 10, generally below the midline 11 of the club head and displaced laterally outwardly and inwardly from a central axis 33. In this manner, club head weight is concentrated outwardly, and downwardly. It is believed by concentrating the weight in these positions additional lift is provided to the ball as the centre of weight of the club head is low on the club face 14. As well this positioning of the weight means 30, 31 provides a higher mass moment of inertia about the central axis 33 of the club head 10, meaning that the club head 10 will tend to travel straighter even if the ball contact is made off centre. This has the desirable effect of maximizing the sweet spot of the club face 14 and reducing the tendency to hook or to slice the ball.

The weight means 30, 31 include a number of features which can now be described. The first feature, is the overall shape of the weight means. In order to provide an aesthetically pleasing and aerodynamic appearance to the club head 10, it is preferred to curve the club head in toward the rear. Thus, the club head 10 curves inwardly, from the sides, downwardly from the top and upwardly from the bottom. Additionally, as it is preferred to locate the weight means 30, 31 closely adjacent to the outer edge of the club, it is preferred to taper the rearward extension 32 of the

weight means 30, 31 to permit the main body 12 of the golf club head 10 to taper. In other words, the rearward extension 32 of the weight means 30, 31 tapers in generally the same manner as the body, so that the lower weight means 30, 31 remains below the outer surface of the club head 10.

5 Additionally, the forward exterior surfaces 34 of the weight means 30, 31 are roughened to provide better surface adhesion and gripping contact between the weight means 30, 31 and the moulded main body 12. Good results have been achieved by knurling the outer surface of the weight means 30, 31 for that portion of the weight means 30, 31 prior to
10 the taper on the rearwardly extending portion 32. When the mouldable material is poured into the mould around the peaks and valleys of the knurling, and sets, it securely locks the weights means 30, 31 in place.

 A further feature of the weight means 30, 31 is formation of a mounting socket 38 on each weight means which has two functions. The
15 first function is to provide a socket 38 for holding the weight means 30, 31 in place in the mould, when the moulded main body 12 is moulded around the weights. Most preferably therefore the socket 38 is provided with threads to form a releasable yet secure attachment to, for example, a mounting pin (not shown) which may form part of the mould (not shown).
20 The pin allows the weights 30, 31 to be positioned in the mould, in exactly the correct position, and free from contact with any of the sides of the mould. Although good results have been achieved with a threaded socket 38, other forms of releasable connection for the mounting pin could also be used. The second function of the threaded socket 38 is that it provides a bonding
25 anchor when the second moulding step takes place, as described more fully below.

 It will also be noted that the shaft receiving bore 24 of the main body 12 extends into the body and intersects the weight means 31. Consequently the weight means 31 is provided with a mating curved surface
30 39 to permit the shaft receiving bore 24 to extend through toward the bottom of the club head 10. It will be appreciated that due to the removal of weight

from this portion of the weight means 31, the weight means 31 must be made slightly longer than the weight means 30 if they are to have substantially the same weight. Thus the rearward portion of the weight means 31 extends slightly further backward, as shown in Figure 3 than does the weight means 30.

It will now be appreciated that the formation of a curved opening 39 in the weight means 31 assists in the club head 10 integrity, since the club head 10 is stronger by means of the overlap between the shaft and the weight means 31. As can be seen in Figure 4, the weight means 31 overlaps or curves around the front edge of the shaft 24 at 25 essentially forming a key way, which prevents front to back motion of the shaft 27 in bore 24.

It will also be appreciated that while reference is made in the drawings to cylindrical weights with bullet shaped ends, other shapes could also be used. For example, the weights could be thinner elements which more closely follow the curve of the side and bottom surfaces of the club head 10, in essence being shaped like brackets on either side. However, in such a case it would be more difficult to machine the weights than the preferred embodiment. The weights of the preferred embodiment are simply formed from standard brass rod or stock, and thus are easy and inexpensive to fabricate.

In Figure 2, the underside of a golf club head 10 according to the present invention is shown. It includes a bottom surface 44, which has two guiding ribs 45, 46. These guiding ribs extend out of the bottom surface 44 and are parallel to midline axis 33. Essentially, these guiding ribs 45, 46 act as rails to align the golf club head 10 in the event accidental contact is made with the ground during the swing. As such they are generally rounded and peaked, and taper from front to back. Although two are shown, more or fewer could be used.

Also visible in Figures 1 and 2 are surface ribs 48, which extend from the front to back faces. These ribs also help the aerodynamic

action of the club head 10 during a golf swing. These surface ribs 48 are quite small, being only .2 mm high and are spaced between 1 and 10 mm apart. More or fewer ribs 48 could also be used.

Turning now to the main body 12 the attachment of the shaft 27 to the main body 12 can now be more fully understood. In particular there is according to the present invention at least one shaft anchoring element 40. Most preferably the shaft anchoring element 40 takes the form of a tube of metal, such as aluminum, which is moulded into the main body 12. In the embodiment of Figure 4 there are provided two such elements. In the embodiment of figure 6 there is provided only one such element. It will be appreciated by those skilled in the art that either would achieve the desired results.

A problem with prior moulded golf club heads has been to achieve a secure attachment to the shaft 26. This is because it is difficult to achieve a good bond between metal and most plastic composites of the type that have the properties suitable for being used as golf club heads. The present invention addresses this problem by eliminating the need to try to bond metal to cured plastic. Essentially the shaft anchoring element 40 is moulded into place around the shaft receiving bore 24 at the time the main body 12 is moulded.

The shaft anchoring element 40 can be any of a variety of shapes and configurations, provided that it on the one hand is securely anchored into the main body of the club head 10 such as by being moulded into the main body 12, and on the other hand permits the shaft 26 to be securely attached to it. Good results have been achieved through use of a tubular anchoring element 40. On the outside surface 41 of the tubular anchoring element is formed a roughened surface, by knurling or the like. As the liquid composite moulding material is poured or injected into the mould, the material fills into the surface features and then sets. Because of the peaks and valleys of the Knurling, the anchoring element 40 is therefore securely held in place in the moulded main body 12.

The inner surface of the tubular element is provided with a smooth bore, generally dimensioned to closely receive a shaft 26 therein. In this manner a secure adhesive bond can be formed between the inner face of the anchoring element 40 and the shaft 26, in a conventional manner. This epoxy or adhesive bond 42 is a metal to metal bond which has demonstrated sufficient adhesion in the past in the art.

To assist in completing a good bond and to further secure the club head 10 on the shaft 26 there is also provided an attachment screw 50 as shown in figure 6. The attachment screw 50 passes through the main body 12 generally perpendicularly to the shaft 26. The screw 50 passes through the anchoring element 40 and then onto the shaft 26 or preferably through the shaft 26 as shown in Figure 6. In this way the screw 50 helps to provide resistance to the shaft 26 against the pull out force typically generated during a golf swing.

The method of making a club head 10 according to the present invention can now be described. Good results have been achieved with a two step moulding process. Moulding is preferred because it permits the use of a strong but light weight body material which in turn permits the weight means 30, 31 to be made as large as possible relative to the overall weight of the club head 10. In this manner more of the total weight of the club head 10 can be concentrated in a desirable position, namely low and toward the outer and inner side edges of the club head 10.

The preferred material is a mouldable composite, such as urethane. Most preferred the urethane should have a hardness of between 60 and 80 on the Durometer D hardness scale. Good results have been achieved with a hardness of between 68 and 72, with the most preferred hardness being about 70. Other mouldable materials may also be used, but urethane is preferred for its strength to weight ratio and its ease of moulding. What is desired is a mouldable material which is able to fill the full mould around the weight means 30, 31 and the anchoring element as described above without forming bubbles or pockets or the like. Good results have

been achieved with the body being formed from Airthane PET 75D™ polyurethane intermediate from Air Products with ETHACURE 300™ curative from ELBAMARLE, and with the insert being formed from VERSATHANE 2180™ urathane prepolymer with VERSALINK 740M™ from Air Products.

The first moulding step according to the present invention is as follows. First, the weight means 30, 31 are positioned on mounting pins in a mould. Then the anchoring elements 40 are also positioned in the mould. Then a first charge of moulding composite is pushed or poured into the mould around the positioned elements. This is then allowed to cure thereby securely locking the various elements in place. Then the cured and partially moulded article is removed from the mould. At this point the club head is in the form as shown in Figures 3 and 4. There is formed on the front surface of the club head a pocket or socket 59 for receiving an insert. The back wall of the pocket is formed at the level of a front face of each of the weight means 30, 31. In this manner it is easy to remove the mounting pins from the weight means 30, 31. Then the pin receiving sockets are exposed and the club head is ready for the next moulding step.

In the next moulding step an insert 60 is moulded into the front face 14 of the club head 10. Although a metal to plastic bond is difficult to achieve, a plastic to plastic bond is not. Therefore, the insert 60 can also be formed from moulded composite and will form a secure bond to the already portion moulded club head 10. However to assist in the structural integrity of the finished product certain other features are provided.

For example after the first moulding step there is a wall or lip 62 formed around the outside of the front face 14. This wall 62 forms the cavity or pocket 59 into which the insert 60 is moulded. To ensure the best fit of the insert into the club head 10, this wall 62 is undercut in the nature of a dovetail as shown at 66. Thus when the insert material is poured into the front face 14, it will be larger in area at the back of the insert 60 than

toward the front face 14 which will have the effect of keeping the insert 60 securely in the club head 10.

There are two steps to forming the insert pocket 59. The first is to use a mould plate which forms some of the pocket 59 at the time the balance of the club head 10 is made. However this is only an intermediate step. The next step is to machine the outer sides of pocket 59 to form the lip on wall 62 with the dovetail or under cut 66. In this way it is easy to form the undercut lip and to ensure a good surface for attachment of the insert 60. Of course it is necessary to ensure that the pocket 59 is clean and without debris before moulding the insert 60 therein.

In addition the mounting pin receiving sockets 38 formed on the weight means 30, 31 will also be filled with insert material as the insert pocket 59 is filled. When hardened into the sockets 38 this will assist in forming a strong connection between the insert 60 and the balance of the club head 10 by acting as bonding anchors as discussed above. Lastly there is also formed a central threaded opening 70 which acts in the same manner as a larger bonding anchor. Once the insert material is poured into this opening and hardens, the threads 72 in opening 70 will also act to keep the insert in place.

The last step in the process of making the club head 10 is to finish the outer face. This is most preferably done by machining after the insert is cured. For example on a CNC machine, can be used to remove any excess material and to cut the exact front face loft 80 desired. Also, the front face grooves 82 can be cut into the face.

It can now be appreciated that the insert 60, while also being a mouldable material can be of a different material from the main body 12. In particular the material can have a higher hardness than the main body 12. The hardness of the insert can range between 70 and 110, with the most preferred hardness being about 80 on the Durometer D scale. Having a hard insert has certain advantages. Firstly, the insert must have a minimum hardness to meet U.S.G.A. rules. Secondly a harder insert will provide a

more efficient bounce off the club face, since the harder the material is the less energy is lost in deformation. On the other hand providing an insert which is too hard is undesirable, as harder material is generally more brittle and thus prone to failure. Additionally a harder insert reduces the feel of the club, which is undesirable. Thus the preferred range of hardness is between 75 and 85, with the most preferred hardness being about 80.

A golf club head 10 made according to the present invention can be exactly controlled and made to precise specifications. Unlike traditional woods made from wood, whose density and strength characteristics can vary from piece to piece, every club head made according to the present invention will be dimensionally and functionally identical, to a very high degree of precision. In addition to allowing for the weight concentration as described, with its beneficial effects on the swing and impact dynamics, there is also an ease of manufacturing. It may be less expensive to mould club heads out of the desired composite, than if made from metal or wood.

The use of a light weight body with concentrated weights also allows for an enlarged sweet spot without an enlarged club head. A smaller club head with a smaller club face has a number of advantages. Firstly, the smaller club head will have less drag than a larger club head. Thus, it will be marginally easier to swing and accelerate into the ball contact position. More importantly, a smaller club head will be much less prone to being stopped, for example, by grass, in the event a shot is being made out of the rough. A smaller club head will not encounter as much grass, reducing the resistance to the swing by the grass and making it easier to hit a ball out of the rough. Again, this advantage arises because of the smaller surface required to form a larger sweet spot, according to the present invention. Ideally the club face has a maximum height in a three wood of 1.35" and a maximum width of 3.05". This, because of the rounded corners, results in a three wood club face that is less than about 4.00 square inches in area,

or even slightly less, between 3.5 square inches and 3.75 square inches in area.

It can now be appreciated that the present invention teaches a club head which can be made easily and efficiently, and most importantly, almost exactly identical every time. Unlike a casting process, which may have manufacturing variations, or using wood, which has notoriously variable properties, the present invention can be made from the exact same material to extremely tight tolerances. Thus, every club should be very close to the same.

It will be appreciated by those skilled in the art that the foregoing description is in respect of preferred embodiments of the invention only, and that other variations are possible without departing from the broad scope of the present invention. For example, while the preferred method of forming the insert is through moulding, other ways of attaching an insert might also be used. Also, other materials could be used for the insert if desired, such as metals, wood or the like. However, such elements are less preferred, because they will not be as easy to attach to the club face as the preferred moulded insert.

20

I CLAIM:

1. A golf club head comprising:
 - 5 a main body moulded from a mouldable material having a first lower density;
means for weighting said main body, said weighting means having a second higher density and being positioned within said main body to enhance the striking characteristics of the main body;
 - 10 a shaft receiving bore formed in the main body; and
a shaft anchoring element proximate to said shaft receiving bore, said shaft anchoring element being moulded into said main body and being sized and shaped to receive a golf club shaft therein
wherein said main body may be securely attached to a golf
 - 15 club shaft.
2. A golf club head as claimed in claim 1 wherein said mouldable main body is made from urethane.
- 20 3. A golf club head as claimed in claim 1 wherein said weighting means is made from metal.
4. A golf club head as claimed in claim 1 wherein said weighting means is made from metal and comprises a pair of opposed weights located
25 generally symmetrically about a central axis of said main body, toward lateral side edges of said main body.
5. A golf club head as claimed in claim 4 wherein each weight includes a forward portion and a tapered rearward portion;
- 30

6. A golf club head as claimed in claim 5 wherein said weights include means for bonding to said moulded main body.

7. A golf club head as claimed in claim 6 wherein said bonding means comprises knurling on at least a portion of the outside of the weight.

8. A golf club head as claimed in claim 1 wherein said shaft anchoring element is metal and is moulded into said main body.

9. A golf club head as claimed in claim 8 wherein said shaft anchoring element includes a shaft receiving section for closely receiving a shaft therein to permit the formation of a bond between the shaft anchoring element and the shaft wherein said shaft is secured within said club head.

10. A golf club head as claimed in claim 9 wherein said shaft anchoring element includes a roughened surface to facilitate the bonding of said shaft anchoring element into said main body.

11. A golf club head as claimed in claim 10 wherein said shaft anchoring element includes an aperture for a set screw.

12. A golf club head as claimed in claim 10 wherein said shaft anchoring element is a tube of aluminium, and has an outer surface and an inner surface, wherein said outer surface is knurled to promote adhesion to said moulded main body and said inner surface is smooth to promote adhesion to said shaft.

13. A golf club head as claimed in claim 1 further including a front striking face and wherein said front striking face includes an insert.

14. A golf club head as claimed in claim 13 wherein said insert is moulded and is comprised of a material having a different hardness than said main body.

5 15. A golf club head as claimed in claim 14 wherein said insert has a higher hardness than said main body.

16. A golf club head as claimed in claim 15 wherein said insert is formed from moulded urethane and is tapered outwardly from front to back
10 to retain said insert in place.

17. A golf club head as claimed in claim 16 wherein said weights are positioned in said moulded main body to extend rearwardly from an interface between said insert and said main body.
15

18. A golf club head as claimed in claim 1 wherein said moulded main body is formed with a front insert receiving pocket.

19. A golf club head as claimed in claim 1 further including
20 aerodynamic ridges which extend from the front of the club head to the rear of the club head.

20. A golf club as claimed in claim 20 wherein said main body includes a rearwardly extending dimple on a top surface thereof.

25 21. A golf club head as claimed in claim 1 wherein said moulded main body includes at least one ridge extending parallel to the axis of movement of the club in use extending from a lower surface thereof.

30 22. A golf club head as claimed in claim 22 wherein said moulded main body includes two of said ridges.

23. A golf club comprising a golf club head according to claim 1 to 20, a golf club shaft and a grip.

5 24. A golf club head comprising:
a main body moulded from a mouldable material having a first lower density and a first hardness;
means for weighting said main body, said weighting means having a second higher density and being positioned laterally within said
10 main body to enhance the striking characteristics of the main body when used as a club head;
a shaft receiving bore formed in the main body; and
a moulded face insert having a second hardness which is greater than said first hardness.

15 25. A golf club head as claimed in claim 24 wherein said means for weighing said main body extends rearwardly in said main body from an interface between the main body and the moulded insert.

20 26. A golf club head as claimed in claim 24 wherein said first hardness is in the range of 60 to 75 on the Durometer D scale and said second hardness is in the range of 80 to 90 on the Durometer D scale.

25 ~~27.~~ A method of moulding a golf club head comprising:
a) positioning weights within a mould;
b) moulding a main body around said weights, including forming a shaft receiving bore in said main body;
c) forming a front insert receiving pocket on said main body;
and
30 d) inserting an insert into said insert receiving pocket; and

28. A method of moulding a golf club head as claimed in claim 27, wherein said step of positioning said weights comprises mounting said weights upon a mounting pin to securely position the weights in the mould.

5 29. A method of moulding a golf club head as claimed in claim 27, wherein said step of forming said front insert pocket includes moulding said front insert pocket in a first moulding step.

10 30. A method of moulding a golf club head as claimed in claim 27, wherein said step of forming said front insert pocket includes machining said insert pocket into a front face of said moulded main body.

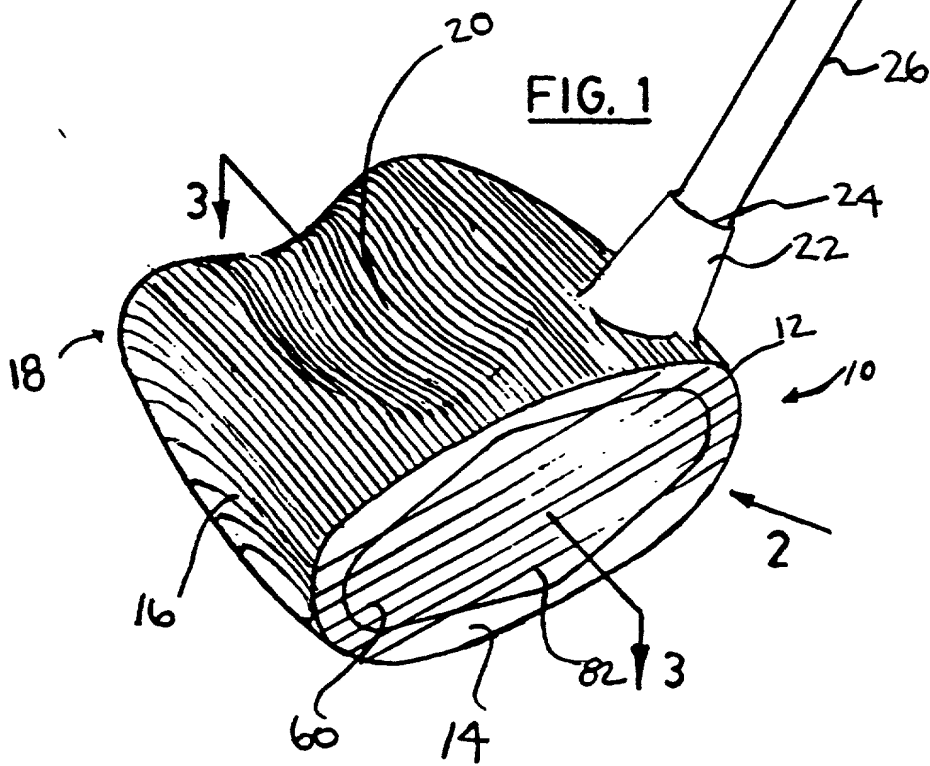
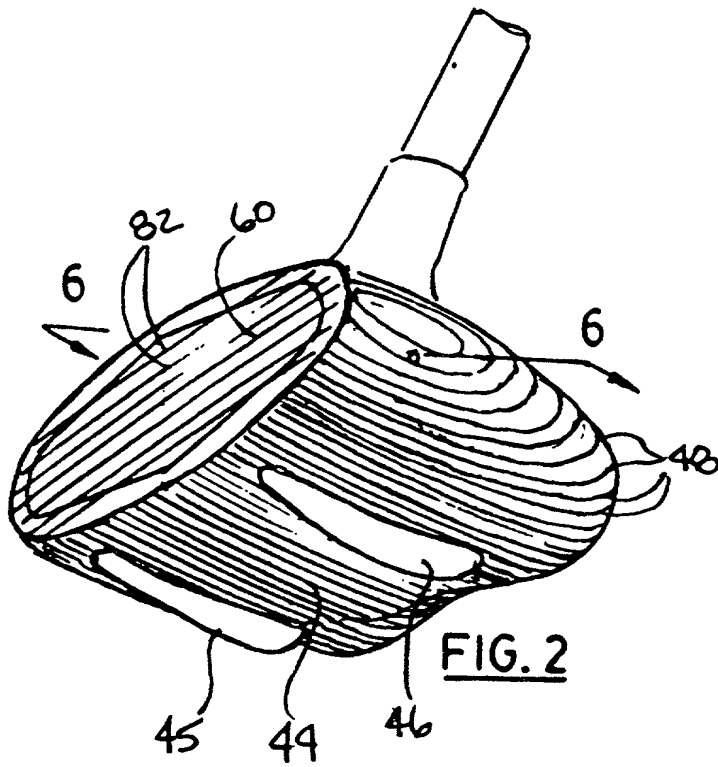
15 31. A method of moulding a golf club head as claimed in claim 27, wherein said step of inserting said insert into said insert receiving pocket comprises moulding said insert into said front insert receiving pocket.

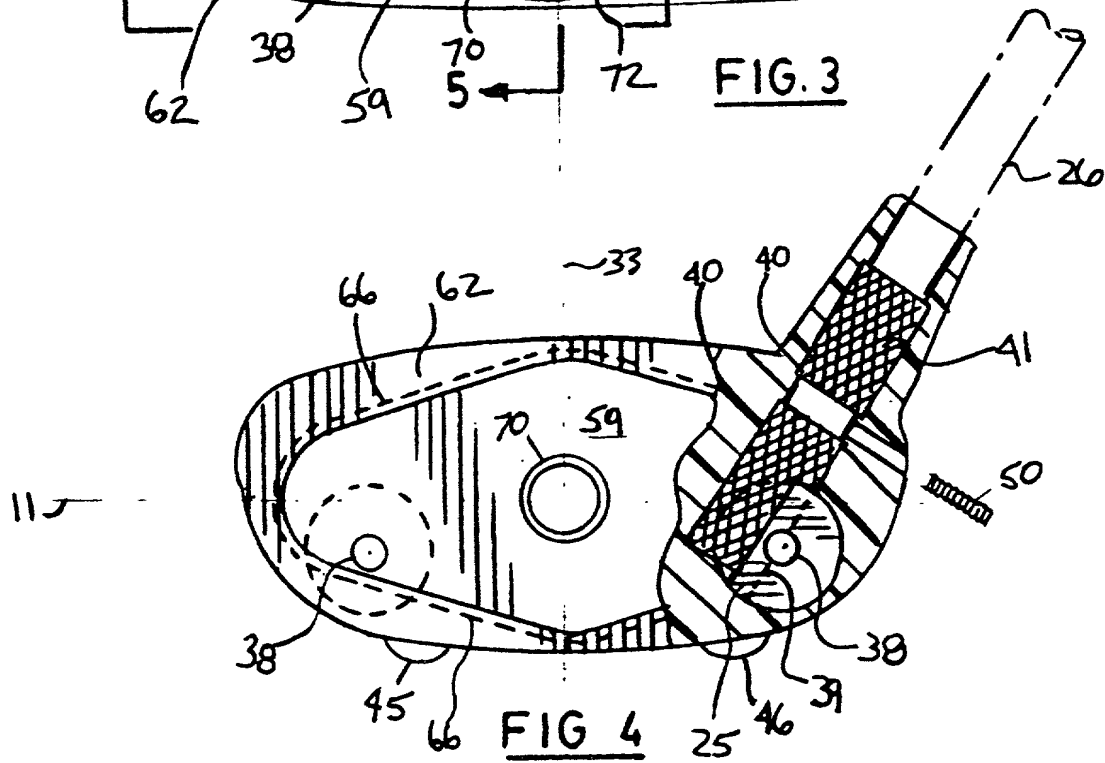
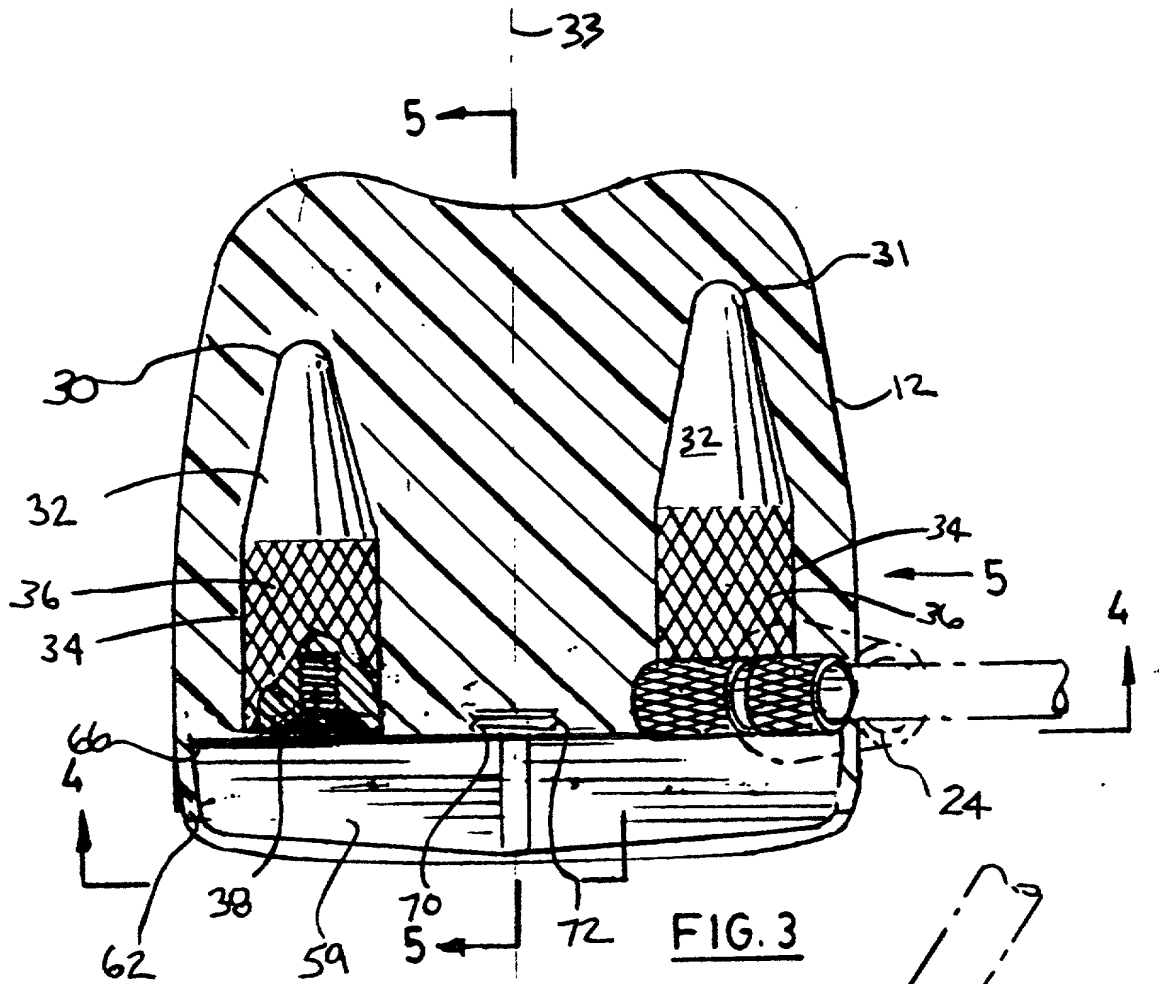
20 32. A method of moulding a golf club head as claimed in claim 27, further including a step of finishing said club face which step includes machining a desired loft and grooves into the front face of the moulded insert and club face.

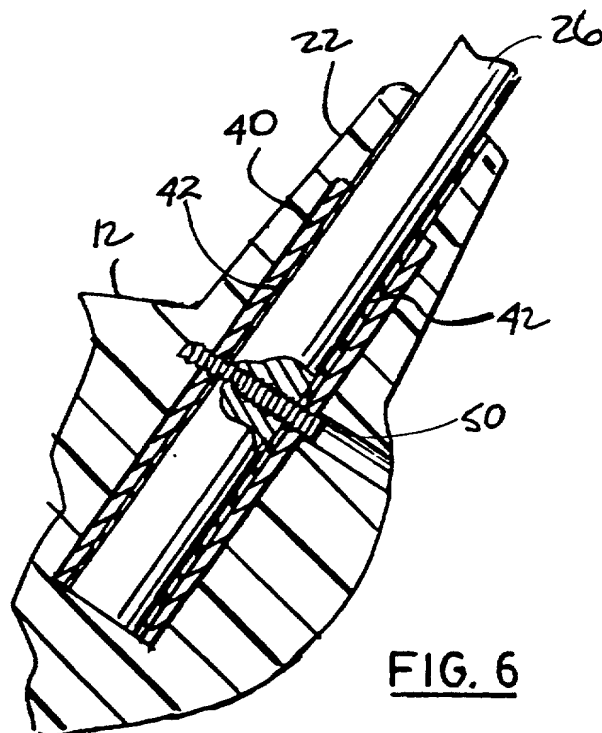
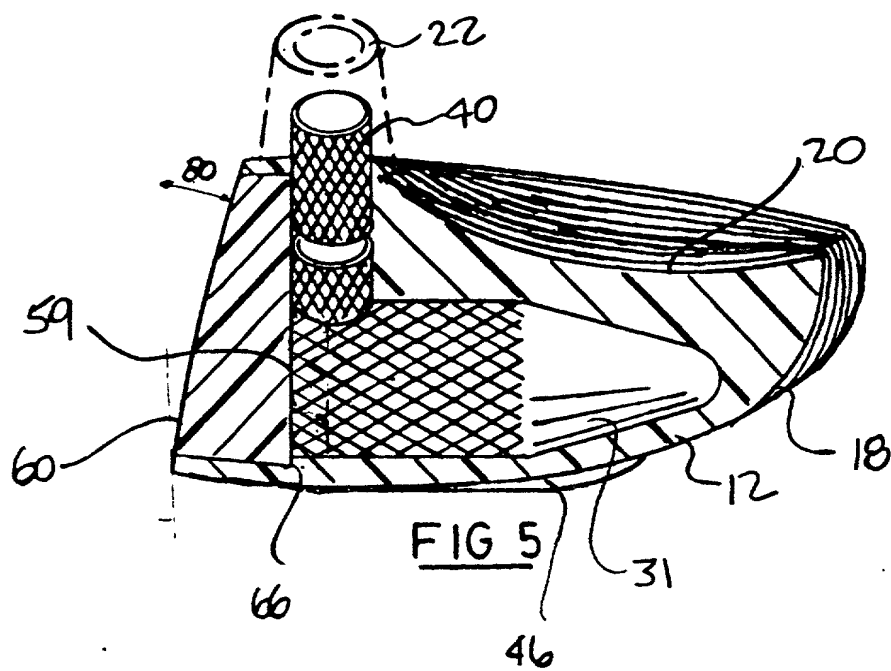
ABSTRACT OF THE DISCLOSURE

A golf club head for use in a golf club. The club head has a moulded main body with weighted inserts to improve striking characteristics. The club head includes a shaft anchoring element to attach the club head to a golf club shaft. In one embodiment the club head includes a hardened insert to form a striking face on the golf club. In a further embodiment, the golf club head is formed during a two-step process, first the moulding of a main body, then, the moulding of a insert to form a front face.

100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000







DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am an inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled: GOLF CLUB HEAD AND METHOD OF MAKING THE SAME the specification of which (check one)

is attached hereto X was filed on _____ as
Application Serial No. _____

I hereby state that I have reviewed and understand the contents of the above identified specifications, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, S1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, S119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

<u>not yet available</u>	<u>CANADA</u>	_____	Yes ___ No ___
(Number)	(Country)	(DD/MM/Year Filed)	
_____	_____	_____	Yes ___ No ___
(Number)	(Country)	(DD/MM/Year Filed)	

____ Additional applications identified on attached sheet.

I hereby claim the benefit under Title 35, United States Code, S120 of any United States Application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code S112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, S1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

Application Serial No.	Filing Date	Status - Patented, pending, abandoned
_____	_____	_____
Application Serial No.	Filing Date	Status - Patented, pending, abandoned
_____	_____	_____

____ Additional applications identified on attached sheet.

I hereby appoint the following attorneys and/or agents to prosecute this application and to transact all business in the Patent and Trademark Office in connection therewith:

James T. Nenniger, Reg. No. 32,670; Gregory A. Piasetzki, Reg. No. 37,056.

Address all telephone calls to James T. Nenniger, Reg. No. 32,670 at Telephone No. (416) 955-0050. Address all correspondence to PIASETZKI & NENNIGER, 120 Adelaide Street West, Suite 2308, Toronto, Ontario, Canada, M5H 1T1.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such wilful false statements may jeopardize the validity of the application or any patent issued thereon.

FULL NAME OF SOLE FIRST INVENTOR	INVENTOR'S SIGNATURE
<u>JOHN SAKSUN, SR.</u>	<u><i>John Saksun</i></u>
RESIDENCE	
<u>8 Rangemore Road, Toronto, Ontario, M8Z 5H7, CANADA</u>	
POST OFFICE ADDRESS	

DATE
<u>Oct 20 / 97</u>
CITIZENSHIP
<u>Canadian</u>

Same as above.

____ See attached sheet for similar information and signature for additional joint inventors.